

ABSTRACT

A method for fabricating copper-faced electronic modules is described. These modules are mechanically robust, thermally accessible for cooling purposes, and capable of supporting high power circuits, including operation at 10 GHz and above. An imprinting method is

5 described for patterning the copper layers of the interconnection circuit, including a variation of the imprinting method to create a special assembly layer having wells filled with solder. The flip chip assembly method comprising stud bumps inserted into wells enables unlimited rework of defective chips. The methods can be applied to multi chip modules that may be connected to other electronic systems or subsystems using feeds through the copper substrate, using a new

10 type of module access cable, or by wireless means. The top copper plate can be replaced with a chamber containing circulating cooling fluid for aggressive cooling that may be required for servers and supercomputers. Application of these methods to create a liquid cooled supercomputer is described.